4.2 Integrated Technical Planning (Satisfies Criteria of EIA/IS731 FA 2.1 & iCMM PA 11)

4.2.1 Introduction to Integrated Technical Planning

Integrated Technical Planning is the tactical and strategic means of defining problems, forecasting conditions, and coordinating program elements to maximize program focus on providing superior products and services. The Integrated Technical Planning process provides the technical guidance tools required to track and manage program activity, as well as the program-specific process tailoring required to optimally satisfy program needs. This System Engineering (SE) element has been subdivided into two primary areas: plans and reviews. The plans include the Integrated Program Plan (IPP) and supporting technical plans such as the Master Verification Plan (MVP), the System Engineering Management Plan (SEMP), the System Safety Management Plan etc. The review section contains both design reviews and audits. This section includes all planning documents; specific development details are in Appendix E. Tailoring may be performed by deleting planning requirements, with rationale provided for each deletion. The only allowable additions are those unique to the program and formally required by the stakeholders. The size, complexity and visibility of a program will determine which SE elements need to be supported by more detailed planning documents. Integrated Technical Planning applies to all programs/projects regardless of size, whether or not they are new programs or changed or derivative projects. The size and scope of planning may change to meet program needs. A change to a program with an existing IPP, SEMP, or other plans only requires documentation that existing plans still apply. On any existing program, the current plans should be referenced in all new plans developed.

4.2.1.1 Integrated Technical Planning Objective

The objective of the Integrated Technical Planning process is to provide program management with a sound, repeatable method for executing requirements-based and structurally managed programs.

4.2.1.2 Process-Based Management

The Process-Based Management (PBM) chart appears in Figure 4.2-1.

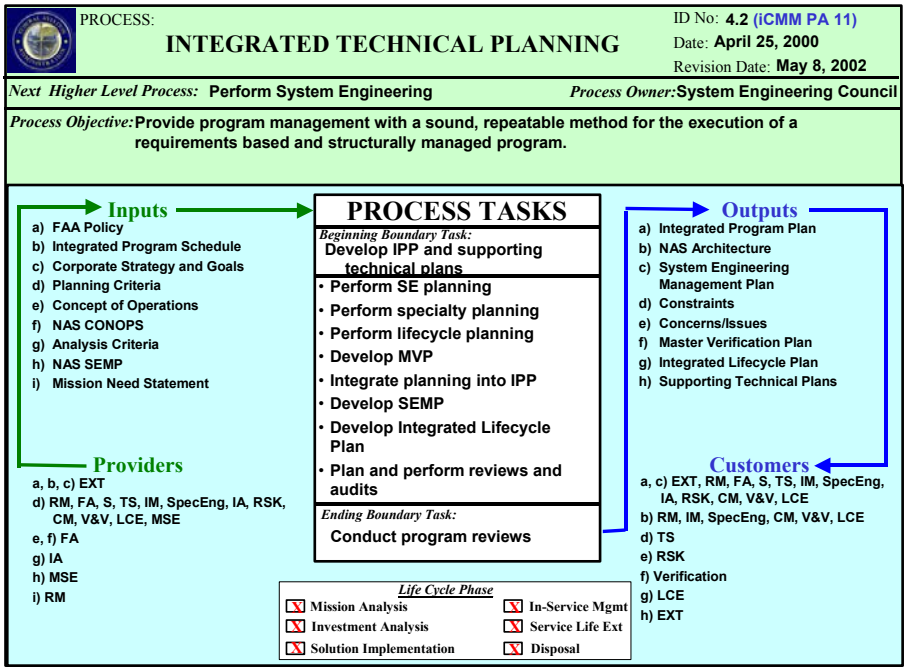

Figure 4.2-1. Integrated Technical Planning Process-Based Management Chart

4.2.1.3 Inputs to Integrated Technical Planning

The inputs to the process at this level appear in the PBM chart. Some of these inputs provide requirements, while others impose constraints.

4.2.1.4 Integrated Technical Planning Process Tasks

The process tasks are shown on the PBM.

4.2.1.5 Outputs of Integrated Technical Planning

The output from this process constitutes most of the "Manage To" package, as well as a part of the "Design To" package. A summary of the output for this process is shown on the PBM chart above. Details of the outputs are documented later in this chapter.

4.2.1.6 Integrated Technical Planning Process Metrics

The metrics for performance of the Integrated Technical Planning process are the sum of the metrics on lower-level processes.

4.2.1.7 Integrated Technical Planning Tools

Integrated Technical Planning requires word processing, display, and scheduling tools.

4.2.1.8 Key Decisions

Key decisions required for this process are:

- Request by the stakeholder and/or program manager for Integrated Technical Planning (usually included in the IPP and SEMP)
- Identification of necessary planning elements by the program system engineer and the project team
- Program manager acceptance that the identified planning elements are necessary
- Baseline plan accepted by the program manager, stakeholders, and the Joint Resources Council (JRC)
- Program manager's approval of the IPP, MVP, SEMP and any other supporting technical plans

4.2.1.9 Key Process Interfaces

Integrated Technical Planning interfaces with all other SE processes, either receiving inputs from them or providing outputs to them.

4.2.1.10 Acquisition Management System Process Interface

4.2.1.11 The Acquisition Management System (AMS) process interface is described in Chapter 3. AMS process activities that most strongly interact with the SE must be taken into account in the Integrated Technical Planning process. Plan Review

All plans are living documents and are subject to continuous review and update to satisfy program needs and changes. All available plans should be reviewed at each AMS milestone and as part of subsequent system baseline modifications throughout the program lifecycle.

4.2.2 Integrated Program Plan

4.2.2.1 Introduction to the Integrated Program Plan

The IPP is the primary document within the AMS for planning the actions and activities needed to execute the program within the cost schedule, benefits, and performance baselines in the approved Acquisition Program Baseline (APB). An approved IPP is required for the Final Investment Decision (JRC-2B). IPP development is initiated when the Mission Needs Review (MNR) has been completed and when the Concept of Operations (CONOPS) has been developed. The IPP is reviewed and updated at all subsequent phase exit reviews and reflects changes throughout the program's lifecycle. The IPP reflects contractual requirements and unique programmatic requirements.

The IPP is the recognized plan used to manage a project and contains the Integrated Program Schedule, which encompasses milestones (events), accomplishments, and criteria. The IPP relates accomplishments to program events and demonstrates a logical, event-driven sequence of effort. It is directly traceable to the Work Breakdown Structure (WBS) and Statement of Work (SOW). The IPP provides vertical and horizontal integration traceability through its task statements and numbering system and identifies task relationships. It facilitates resource planning and provides time-phased tasks, a tool for

measuring progress against planned efforts, problem identification, and a framework to develop recovery and workaround plans. Table 4.2-1 lists the sections of an IPP.

Table 4.2-1. Integrated Program Plan Table of Contents

Integrated Program Plan Table of Contents	
1	BACKGROUND
1.1	Mission Need
1.2	Status
2	OVERVIEW
2.1	Program Scope
2.2	Products
3	INTEGRATED PROGRAM FUNDING
4	INTEGRATED PROGRAM SCHEDULE
5	PERFORMANCE
5.1	Core Work Activities
5.2	Program Management Work Activities
5.3	Procurement Work Activities
6	BENEFITS
7	PHYSICAL INTEGRATION
8	FUNCTIONAL INTEGRATION
9	HUMAN INTEGRATION - RESERVED
10	SECURITY - RESERVED
11	IN-SERVICE SUPPORT
12	VERIFICATION (INCLUDES TEST AND EVALUATION)
13	IMPLEMENTATION AND TRANSITION
14	QUALITY ASSURANCE
15	CONFIGURATION MANAGEMENT
16	IN-SERVICE MANAGEMENT

4.2.2.2 Inputs to the Integrated Program Plan

The following inputs are necessary to develop the IPP:

- Program objective as reflected in the stakeholder-provided, top-level Mission Need Statement (MNS) and requirements documents, which detail the operational environments in which the system is expected to operate
- Program-specific guidelines
- Top-level program constraints and assumptions, including program-specific organizational constraints and assumptions to be used on the program

- Program-specific schedule constraints and events
- Concept approach, including top-level conceptual alternatives, functional analyses, design support alternatives, and initial system evaluations
- Any specified government or external standards to be employed on the program
- Any other supporting technical plans (e.g., MVP, SEMP) to be presented at the JRC-2B, either in a draft or baseline stage

4.2.2.3 Integrated Program Plan Steps

An IPP is normally coordinated and written by SE, using the following steps.

4.2.2.3.1 Step 1: Collect Inputs

All program elements, both technical and nontechnical, are responsible for providing IPP inputs. The stakeholders provide the inputs identified in Paragraph 4.2.2.1.1 for every technical and nontechnical discipline involved. Inputs are also gathered from the RFP, SOW, WBS, organizational charts, Contract Data Requirements List (CDRL and schedule information.

4.2.2.3.2 Step 2: Prepare Integrated Program Plan

The IPP is prepared in accordance with the format described within the AMS. IPP tools must be selected and a timetable for implementation prepared. The draft IPP includes accomplishments and criteria for each event, responsibility for each accomplishment, entrance and exit criteria, milestone linkages, and supporting narratives. “System Engineering in the Acquisition Management System Program Lifecycle” (Chapter 3) provides some guidelines on the timing for developing various IPP drafts, with the final approved IPP required for the Final Investment Decision (JRC-2B). The AMS FAST Toolset contains the IPP template.

4.2.2.3.3 Step 3: Coordinate and Baseline

The internal and external IPP stakeholders are provided drafts of the IPP for review. Once concurrence is obtained from the stakeholders, the IPP is approved at the JRC-2B and becomes the baseline IPP. SE coordinates IPP impacts and develops workaround strategies.

4.2.2.3.4 Step 4: Maintain Plan

The program progress is monitored continually throughout the life of the program. Changes in the program are reflected in the IPP, which is then coordinated for approval of the modifications.

4.2.2.3.5 Step 5: Provide Current Plan

The IPP is provided to all stakeholders.

4.2.2.4 Outputs of the Integrated Program Plan

There are five basic types of data in the IPP:

- **Data Type 1: Event.** This may be major program reviews, especially the AMS phase exit reviews; or they are sub-events.

- **Data Type 2: Accomplishment.** An accomplishment is the end goal of any program task tied to the event. The accomplishment may be the development of a deliverable or conduct of an analysis or test.
- **Data Type 3: Success Criteria.** A success criterion is the measure of whether the accomplishment was met or not. The criterion may be completion of the task, delivery of a report, or completion of the test. Success criteria may also include quality measures, such as the success of a test or the approval of a report.
- **Data Type 4: Task.** A task is the activity required to accomplish the objectives tied to the event. The task statement should reference the applicable WBS and SOW elements.
- **Data Type 5: Subtask.** A subtask is a subdivision of the task described in the major task.

4.2.2.5 Integrated Program Plan Metrics

The primary IPP metric is publication and approval of the IPP at each AMS milestone. The IPP itself is a metric to evaluate the conduct of the program. The performance and conduct of the events, accomplishments, success criteria, tasks, and subtasks are program metrics.

4.2.2.6 Integrated Program Plan Tools

The primary IPP tool is a generic template for any project using the SE elements and is contained in the FAST Toolset under “Required Planning Documents”. Specific projects may tailor this template to provide information pertaining to specific deliverables, tasks, and tools.

4.2.2.7 Integrated Technical Planning Inputs to the Integrated Program Plan

The Integrated Program Plan and System Engineering. SE planning directly relates to elements of the SE process and is included as sections of the IPP. It describes how the SE process is applied to the given program or project at a summary level with detailed SE implementation activities discussed in supporting technical plans e.g., SEMP, MVP, SSMP etc. These planning sections become the tailored process. All IPP sections apply to every program; however, stakeholder direction or the nature of the program may dictate elimination of a planning section. As an example, a program without any avionics interfaces does not require a certification planning section. The program system engineer documents the rationale for eliminating any IPP sections or tailoring any process, and the program manager approves these actions. Table 4.2-2 lists the sections of an IPP and the SE elements from the SEMP that provide summary level inputs to the applicable IPP sections.

Table 4.2-2. SE Inputs To The Integrated Program Plan

	Integrated Program Plan	
1	BACKGROUND	
1.1	Mission Need	Integrated Technical Planning (ITP)
1.2	Status	ITP
2	OVERVIEW	
2.1	Program Scope	ITP
2.2	Products	ITP

	Integrated Program Plan	
3	INTEGRATED PROGRAM FUNDING	ITP
	INTEGRATED PROGRAM SCHEDULE	ITP
5	PERFORMANCE	
5.1	Core Work Activities	ITP; Functional Analysis (FA); Synthesis (Syn); Trade Studies (TS); Interface Management (IM); Integrity of Analyses (IA); Specialty Engineering (SpecEng – Reliability, Maintainability and Availability – RM&A)
5.2	Program Management Work Activities	Requirements Management (RM); SpecEng (System Safety); Risk Management (RSK)
5.3	Procurement Work Activities	ITP
6	BENEFITS	RM
7	PHYSICAL INTEGRATION	Lifecycle Engineering (LCE – real property; deployment and transition); SpecEng (Hazardous Materials Management/Environmental Engineering; Electromagnetic Environmental Effects E^3)
8	FUNCTIONAL INTEGRATION	IM
9	HUMAN INTEGRATION	SpecEng (Human Factors Engineering)
10	SECURITY	SpecEng (Information Security Engineering)
11	IN-SERVICE SUPPORT	LCE (Integrated Logistics Support; Sustainment/Technology Evolution)
12	VALIDATION (INCLUDES TEST AND EVALUATION)	Validation and Verification (VV)
13	IMPLEMENTATION AND TRANSITION	LCE (Deployment and Transition; Disposal)
14	QUALITY ASSURANCE	SpecEng (Quality Engineering)
15	CONFIGURATION MANAGEMENT	Configuration Management (CM)
16	IN-SERVICE MANAGEMENT	LCE (ILS; Sustainment/Technology Evolution)

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162 The following describes which SE element is the source of information for each section of the
163 IPP. The IPP summarizes the SE activities while the SEMP and other supporting technical plans
164 describe the implementation detail.

4.2.2.7.1 Background

Integrated Technical Planning is the source of information for summarizing the mission need and status of the program.

4.2.2.7.2 Overview

Integrated Technical Planning is the source of information about the scope of the program and the primary deliverables.

4.2.2.7.3 Integrated Program Funding

Integrated Technical Planning is the source for WBS, level of effort and schedule/duration information in sufficient detail to allow cost estimators to identify funding requirements.

4.2.2.7.4 Integrated Program Schedule

Integrated Technical Planning is the source for WBS, milestone and SE activity information to allow for a logical networking of program activities to achieve program objectives.

4.2.2.7.5 Performance

Within the “Core Work Activities” section, SE elements that are not specifically broken out as separate work activities are described here. SE elements such as Integrated Technical Planning, Functional Analysis, Synthesis, Trade Studies, Interface Management, Integrity of Analyses and Specialty Engineering sub-elements such as Electromagnetic Environmental Effects (E^3) and Reliability, Maintainability and Availability (RM&A) can be addressed to the extent that they apply.

Within the “Program Management Work Activities” section, specific SE elements such as Requirements Management, Specialty Engineering (System Safety) and Risk Management are identified as work activities requiring discussion. Program metrics are also described in this section with Integrated Technical Planning as the source.

Within the “Procurement Work Activity” section, those SE resources required to support Screening Information Request (SIR) release, Request for Proposal (RFP) development, proposal evaluations, and contractor requirements definition are identified.

4.2.2.7.6 Benefits

Requirements Management is the source for technical or performance benefits.

4.2.2.7.7 Physical Integration

SE inputs to this section of the IPP to identify space, facility, environment, hazardous materials and power work activities come from several sources including

4.2.2.7.8 Functional Integration – Reserved

4.2.2.7.9 Human Integration – Reserved

4.2.2.7.10 Security - Reserved

4.2.2.7.11 In-Service Support - Reserved

4.2.2.7.12 Verification—See SEMP

4.2.2.7.13 Implementation and Transition – Reserved

4.2.2.7.14 Quality Assurance – Reserved

4.2.2.7.15 Configuration Management—See SEMP

4.2.2.7.16 In-Service Management - Reserved

It is recommended that, as part of the IPP, these planning sections be reviewed and changed whenever dictated by a change in the program or discovery of a discrepancy in the IPP. It is also recommended that changes to any these planning sections be coordinated with the SEMP, MVP, and other associated plans. All plans shall be reviewed at each phase exit review through the review following the last action required by the plan. After any plan is created following this manual, it is recommended that the plan be provided as reference material for future plan developers. It is recommended this be done through SE. It is also recommended that, along with the plan to be achieved, comments are provided to continue improvement of the plan development process.

4.2.3 System Engineering Management Plan

4.2.3.1 Introduction to the System Engineering Management Plan

The System Engineering Management Plan (SEMP) is the only implementing document that integrates all SE activities. The SEMP unambiguously ties together the organization, direction and control mechanisms, and personnel to be used to attain program/project cost, performance, and schedule objectives. Prepared by the SE manager, this tool identifies and ensures control of the overall SE process and provides greater SE implementation detail than does the higher level IPP. The preliminary issue of the SEMP typically occurs in Mission Analysis; a final version is released in the first phase of Investment Analysis for JRC-2A, and a scheduled update occurs in the later phase of Investment Analysis, with additional updates as necessary to reflect changing input conditions throughout the program/project.

4.2.3.2 Inputs to System Engineering Management Plan

The SEMP relates the technical requirements to program requirements, providing the structure to guide and control the integration of engineering activities needed to achieve the SE objectives consistent with a top-level management plan for the program. The SEMP includes more detailed planning for all SE elements to be executed as part of the program. Organizing to execute the system development involves defining the entire organizational structure (such as teams, work groups, and programs); establishing the responsibilities, authority, and

accountability of each; and clearly defining structural interfaces. It is recommended that this be an iterative process.

Information and data necessary to begin creation of a SEMP include the following:

- Knowledge of corporate strategy and goals
- Description and understanding of the overall program/project, usually found in an IPP or draft IPP
- Identification of top-level program/project requirements, usually from the MNS, final Requirements Document (fRD), change request, or one of the outputs developed during Mission Analysis Structure of engineering and other organizations, both internal (e.g., stakeholder) and external (e.g., supplier)
- Contract documents
- Any restrictions or constraints

4.2.3.3 System Engineering Management Plan Steps

The following steps shall be employed to write a SEMP.

4.2.3.3.1 Step 1: Collect Inputs

4.2.3.3.2 Step 2: Analyze Inputs

To determine the SE effort required and committed to by program management, review the IPP, which is based on the nature and magnitude of the program/project.

- Large and complex system developments demand full System Engineering application to insure success
- Small-scale projects may be run under a subset process
- SE shall coordinate with IPT teams and program management, as their concurrence ensures the project team shall refer to and comply with the SEMP

4.2.3.3.3 Step 3: Define Activities and Efforts

After evaluating all inputs, establish how the SE manager integrates them. Decisions that should be made involve the following:

- Tailoring the SE process
- Selecting an approach to ensure integration of engineering specialties
- How program team members will interact and communicate to execute technical program planning and control
- Identifying the explicit SE responsibilities to be assigned to each individual and organization, which, in total, will account for all such tasks planned
- The structure of the comprehensive SE Master Schedule (integrated with the IPP) for scheduled tasks

- Explicit guidance regarding development of each task for optimal inclusion, as program team members employs the SEMP as a handbook and reference source for essential information

4.2.3.3.4 Step 4: Baseline

Prepare a draft SEMP for review and comment, using input from all affected engineering, engineering specialty, and program/project management organizations and, when appropriate, the stakeholders. The draft may also include contractual SEMP requirements, such as a CDRL Item and/or Data Item Description, with which all affected parties shall comply.

4.2.3.3.5 Step 5: Interface With Other Processes/Plans

In addition to employing the IPP as an input during development, the SEMP interfaces with and forms a roadmap to other SE and engineering specialty plans (e.g., Master Verification Plan). The SEMP addresses all of the SE elements:

- Integrated Technical Planning (Section 4.2)
- Requirements Management (Section 4.3)
- Functional Analysis (Section 4.4)
- Synthesis (Section 4.5)
- Trade Studies (Section 4.6)
- Interface Management (Section 4.7)
- Specialty Engineering (Section 4.8)
- Integrity of Analyses (Section 4.9)
- Risk Management (Section 4.10)
- Configuration Management (Section 4.11)
- Validation and Verification (Section 4.12)
- Lifecycle Engineering (Section 4.13)
- Maintain System Engineering (Section 4.14)

4.2.3.3.6 Step 6: Update and Maintain the Plan

It is recommended that throughout the program/project, the SE manager monitor inputs (especially the IPP). When there is a significant change in one or more inputs, the SEMP should be revised (by repeating the creation steps above).

4.2.3.4 Outputs of System Engineering Management Plan

Table 4.2-3 is a SEMP outline.

299 **Table 4.2-3. System Engineering Management Plan Outline**

System Engineering Management Plan Outline	
SECTION 1	INTRODUCTION
1.1	Scope
1.2	Purpose of the System Engineering Management Plan
1.3	Organization of the System Engineering Management Plan
1.4	SEMP Overview
1.5	*Program/Project name* System Description
1.6	Program Organization
1.7	System Engineering Responsibility Assignments
1.8	System Engineering Environment and Tools
1.9	System Engineering Metrics
SECTION 2	SYSTEM ENGINEERING
2.1	System Engineering Process
2.2	Integrated Technical Planning
2.3	Requirements Management
2.4	Functional Analysis
2.5	Synthesis
2.6	Trade Studies
2.7	Interface Management
2.8	Specialty Engineering
2.8.1	System Safety Engineering
2.8.2	Human Factors Engineering
2.8.3	Quality Engineering
2.8.4	Reliability, Maintainability and Availability
2.8.5	Electromagnetic Environmental Effects (E^3)
2.8.6	Hazardous Materials Management/Environmental Engineering
2.9	Integrity of Analysis
2.10	Risk Management
2.11	Configuration Management
2.12	Validation and Verification
2.13	Lifecycle Engineering
2.13.1	Real Property Management
2.13.2	Deployment and Transition
2.13.3	Integrated Logistics Support

System Engineering Management Plan Outline	
2.13.3.1	Maintenance Planning
2.13.3.2	Maintenance Support Facility
2.13.3.3	Direct-Work Maintenance Staffing
2.13.3.4	Supply Support
2.13.3.5	Support Equipment
2.13.3.6	Training, Training Support, and Personnel Skills
2.13.3.7	Technical Data
2.13.3.8	Packaging, Handling, Storage, and Transportation (P,H,S&T)
2.13.3.9	Computer Resources Support
2.13.4	Sustainment/Technology Evolution
2.13.5	Disposal
2.14	Maintain System Engineering
SECTION 3	
3.1	System Engineering Master Schedule

Appendix E contains more detailed input and format information for the planning associated with all of the SE elements discussed in Section 2 of the SEMP.

4.2.4 Requirements Management Planning—See Appendix E for Details

This planning specifies the tasks, products, responsibilities, and schedule for managing requirements throughout product development. The planning is baselined at the JRC-2B in the IPP and is updated as necessary at subsequent exit reviews.

The planning section details the total effort in managing requirements. The work includes identifying and capturing requirements (Paragraph 4.3.2.1), analyzing and decomposing requirements (Paragraph 4.3.2.2), and allocating requirements (Paragraph 4.3.2.3).

4.2.5 Functional Analysis Planning—See Appendix E for Details

The Functional Analysis planning section of the SEMP specifies the tasks, products, responsibilities, and schedule for functional analysis throughout the development of the product. Because there is no program level SEMP in the early phases of the program (i.e., Mission Analysis and Investment Analysis), Functional Analysis in these phases is guided by the NAS-level SEMP. When the IPP is developed, the Functional Analyses is guided by the program's tailored SEMP. The planning section is baselined at the JRC-2B and is updated as necessary at subsequent exit reviews. This planning section details the total effort for managing functional analysis. This work includes analysis of the concept of operations and environment, the decomposition of functions into subfunctions, decomposing and allocating requirements to functions, evaluating alternative decompositions, defining functional sequences and timelines, defining functional interfaces, and documenting the functional baseline. These tasks are described in Functional Analysis (Section 4.4).

4.2.6 Synthesis Planning - Reserved

4.2.7 Trade Study Planning—See Appendix E for Details

The Trade Study planning documents the formal management planning regarding how alternative solutions to a problem or design issue associated with a program/project product development is to be assessed in a fair and impartial manner.

Trade study planning:

- Provides the formats for how trade study results and information are to be presented to management at design reviews
- Identifies the organization or person designated to be the trade study leader
- Identifies any tools that are to be used in performing of the trade study (i.e., cost models, computer simulations, test articles and fixtures, analytical tools)
- Provides the criteria (including constraints) under which the trade study is to be conducted
- Provides instructions on where trade study results and data are to be stored for future reference and which organization is responsible for maintaining the data

4.2.8 Interface Management Planning—See Appendix E for Details

Interface management (IM) planning ensures establishment of the formal management system of interface (I/F) controls that enable physical and functional compatibility between interfacing hardware, software, personnel, and facilities. This planning:

- Provides the means for identifying, defining, documenting, and controlling the interfaces at all levels of the system
- Provides the means for changing the interfaces as required by the evolution of the design and for resolving interface incompatibilities
- Guides management, control, and documentation of all system functional and physical interfaces
- Establishes the Interface Control Working Group (ICWG) and its policies and procedures
- Contains requirements and templates for preparing, revising, and processing the interface documentation; identifies products
- Establishes the participants of the I/F control process and their responsibilities
- Establishes the interface management schedule

The ICWG Chairman drafts the IM planning policies and procedures in the early phase of Investment Analysis concurrent with the SEMP and the SE Schedule. The ICWG Chairman updates and reviews the ICIM planning section of the IPP to reflect the system functional and physical architectures developed in later phase of Investment Analysis.

4.2.9 Specialty Engineering Planning - Reserved

4.2.9.1 System Safety Management Planning

System safety is the application of engineering and management principles, criteria, and techniques to optimize safety within constraints of operational effectiveness, time, and cost throughout all program lifecycle stages. The NAS Modernization System Safety Management Plan (SSMP) governs system safety efforts conducted in the AMS. The SSMP requires each program to develop, as part of the IPP, an Integrated System Safety Program (ISSP) tailored to the program's safety needs. The ISSP calls for contractors or vendors to develop and maintain a System Safety Program Plan (SSPP) that details the planned safety activities. The SSPP describes safety assessments, tasks, and activities of system safety management and system safety engineering required to support the design process and to identify, evaluate, and eliminate or control hazards throughout the system lifecycle.

Government System Safety engineers in the program are responsible for generating the ISSP, and, typically, the System Engineering Council (SEC) approves it as the first step in the system safety program. Contractor System Safety engineers in the program are responsible for generating the SSPP; the Program Manager approves the document internally, and the SEC approves it externally. System safety is an integral element of system engineering applicable to all design stages. Consequently, the stakeholder typically requires the SSPP as early as possible in the program lifecycle, usually within 60 to 90 days after contract award. Updates to the SSPP are necessary from stage to stage. Significant program changes may also warrant an update.

A comprehensive, approved SSPP provides value to the overall program. Misunderstandings are avoided regarding the safety definitions, scope of safety analysis, and risk-resolution procedures. The SSPP serves to increase safety awareness within the integrated team, building system safety into the product. The SSPP is tailored guidance for the System Safety Manager or engineer. Finally, the SSPP serves as an important audit trail, justifying the safety work performed and the methodology for safety decisions made.

4.2.9.2 RMA Planning - Reserved

4.2.9.3 Human Integration Planning—See AMS section

4.2.9.4 Security Planning - Reserved

4.2.9.5 Quality Assurance Planning - Reserved

4.2.9.6 Hazardous Material Management Planning - Reserved

4.2.9.7 Electromagnetic Interference/Electromagnetic Compatibility and Environmental Planning - Reserved

4.2.10 Analysis Management Planning—See Appendix E for Details

The Analysis Management planning section of the IPP is compiled following JRC-1 approval. It supports the objective of that process: "to create high likelihood that the program's analyses are credible, useful, and sufficient." Analysis Management planning defines the analyses to be performed throughout the program and the operational criteria for the analytic tools to be used,

as well as the users and the requirements for verifying that the results are correct and sufficient. As a part of the IPP, this section is reviewed with any other plans at the JRC-2B.

4.2.11 Risk Management Planning—See Appendix E for Details

Risk is inherent in every program. Stakeholders know this and expect contractors to address risks in program plans. SE addresses three facets of risk: technical, schedule, and cost. Technical risks include all events that may prevent the program from satisfying contractual requirements, including performance, supportability, maintainability, and regulatory requirements. Schedule risks are events that may prevent timely execution of tasks identified in the IPP. Cost risks are events that may cause actual expenditures to exceed estimated costs.

Risk management is a key process within SE. The program and functional managers implement it by ensuring appropriate resources are applied to reduce risk to acceptable levels. Risk management consists of five essential components: identify risks, analyze risks, identify mitigation options, implement risk-reduction plan, and monitor risks.

The risk management planning section describes the approach, methods, procedures, and criteria for risk management and its integration into the program decision process. It is continually updated throughout the program life with the IPP.

4.2.12 Configuration Management Planning—See Appendix E for Details

Configuration Management planning documents the formal management system of CM to ensure that the integrity and continuity of the design, engineering, and cost tradeoff decisions made between technical performance, producibility, operability, testability, and supportability are recorded, communicated, and controlled by program and functional managers. CM planning provides the means for the:

- Configuration Identification process that identifies the functional and physical characteristics of selected system components, designated as configuration items (CI), during the system's acquisition lifecycle
- Configuration Control process that controls the changes to CIs during the system's acquisition lifecycle
- Configuration Status Accounting process that records/reports change processing and implementation status
- Configuration Audits process that supplies current descriptions of developing hardware configuration items (HWCI), computer software configuration items (CSCI), and the system itself

The Configuration Management Organization typically owns this planning section. The planning section may be initiated by inputs from the SE process as early as the Investment Analysis, phase one, but formally starts at Investment Analysis, phase two, and continues throughout the program lifecycle as the system develops and is modified.

4.2.13 Master Verification Plan (Includes Test and Evaluation Planning)—See Appendix E for Details

The MVP contains both validation and verification planning. Validation is the process of proving that the right system is being built (i.e., that the system requirements are unambiguous, correct,

complete, consistent, traceable to needs, operationally and technically feasible, and verifiable). The validation planning process is conducted to demonstrate that the requirements for a system are clearly understood and that it is possible to satisfy them through design work using available state-of-the-art technology, funding, and schedule. Verification is the process (tasks, actions and activities) of confirming that evolving system solutions comply with functional, performance, and design requirements that spell out stakeholder (internal and external) expectations of capabilities, as well as performance and characteristics of the developed system. Product verification may occur during any phase of a product development cycle, but is more likely to occur after the product Preliminary Design Review (PDR). Verification is the process that ensures that system requirements have been met by the design solution and that the system is ready for use in its operational environment. This means that a verified system may demonstrate that it complies with mission need and meets functional, performance, allocated, derived, and interface requirements, as well as design and allocated constraints that achieve customer needs.

The MVP objective is to define all verification activities that demonstrate the system's capability to meet the specification requirements.

4.2.14 Integrated Lifecycle Planning – Reserved

4.2.14.1 Real Property Management – Reserved

4.2.14.2 Deployment and Transition – Reserved

4.2.14.3 Integrated Logistics Support – Reserved

4.2.14.4 Sustainment/Technology Evolution – Reserved

4.2.14.5 Disposal – Reserved

459 **4.2.15 Reviews and Audits**

460 **4.2.15.1 Technical Reviews**

461 **4.2.15.1.1 Joint Resources Council 1 Review**

462 **4.2.15.1.2 Joint Resources Council 2A Review**

463 **4.2.15.1.3 Initial System Requirements Review**

464 **4.2.15.1.4 Joint Resources Council 2B Review**

465 **4.2.15.1.5 Preliminary Design Review**

466 **4.2.15.1.6 Critical Design Review**

467 **4.2.15.1.7 Joint Resources Council 3 Review**

468 **4.2.15.2 Audits**

469 **4.2.15.2.1 Functional Configuration Audit**

470 **4.2.15.2.2 Physical Configuration Audit**

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